

an alignment film on at least one of the first and second substrates.

37. (Amended) A multi-domain liquid crystal display device comprising:

a data line to apply a data signal;

a pixel electrode for driving a liquid crystal, the pixel electrode having an electric field induction window therein;

a gate line crossed to the data line, to define a pixel region;

a common auxiliary electrode formed to surround the pixel region; and

a plurality of electric field distortion dielectric structures formed in different forms within neighboring pixels.

REMARKS

The final Office Action of April 1, 2002 and the Advisory Action dated July 10, 2002, have been received and the contents have carefully been reviewed. Reconsideration and reexamination of the application is respectfully requested.

Applicants respectfully thank the Examiner for indicating the allowability of claims 4-6, 12-16, 18, and 37. Claims 4, 12-16, 18, and 37 have been amended to place these claims in independent form. Claims 1-16 and 18-37 are currently pending in this application.

The Examiner objected to the title of the invention. Applicants believe that the amended title, which was provided in the Amendment filed March 5, 2002, is clearly indicative of the invention. Applicants respectfully request the withdrawal of this objection.

The Examiner rejected claim 30 under 35 U.S.C. § 112, second paragraph, as being indefinite as to the alignment characteristics of the at least two regions of the alignment film. Applicants respectfully traverse this rejection.

Applicants have previously discussed how claim 30 is supported by the recitation in claim 28 in the Amendment filed March 5, 2002. The Applicants directs the Examiner to at least figures 7A-11E and pages 16-19 of the specification of this application for further understanding of claim 30. For example, page 18, lines 14-24 of the specification disclose that “the liquid crystal molecule of the liquid crystal layer may be aligned differently on each region”, that “alignment process or alignment direction is varied”, and that “at least one region of the divided regions may be a non-alignment region or all the divided regions may be a non-alignment region”. Therefore, the recitation of “the regions of the alignment film are not aligned” in dependent claim 30 is supported by the recitation in base claim 28 that “at least two regions...have different alignment characteristics...” Applicants respectfully submit that claim 30 and all of the pending claims comply with 35 USC § 112.

The Examiner rejected claims 1-3, 7-11, 17, and 19-36 under 35 U.S.C. § 103(a) as being unpatentable over Lien (U.S. Patent No. 5,907,380) in view of Ueda et al. (U.S. Patent No. 5,459,596). Applicants respectfully traverse this rejection.

Applicants submits that claims 1-3, 7-11, 17, and 19-36 are allowable over the cited references in that each of the independent claims 1 and 35 recites a combination of elements including, for example, a common auxiliary electrode to surround the pixel region; a pixel electrode; and a plurality of electric field distortion dielectric structures in different forms within neighboring pixels.

None of the cited references including Lien and Ueda et al., which are cited against all of the rejected claims, singly or in combination, teaches or suggests at least these features of the claimed invention.

In the multi-domain liquid crystal display device as recited by claims 1 and 35, the common auxiliary electrode is formed on the same layer as the gate lines to surround the pixel region. The dielectric structures are patterned in different forms within neighboring pixels on the common electrode, so that electric field distortion can be induced. Thereby, control of the alignment direction is facilitated and the viewing angle and multi-domain effect are improved.

On page 4 of the Office Action, the Examiner states, "*Lien does not explicitly disclose a common auxiliary electrode formed to surround the pixel region.*" The Examiner cites Ueda et al. to cure the deficiencies of Lien. However, there is no motivation to combine these two references.

Lien employs a wall of transparent conductive material to control the tilt direction of the liquid crystal. Ueda et al. employs a shield electrode to reduce the parasitic capacitances between the pixel electrode and the scan line and between the pixel electrode and the signal line. One of ordinary skill in this art would not modify Lien by including the common electrode of Ueda et al. because such an arrangement would teach away from the disclosure and purpose of Lien, as discussed in column 1, lines 40-51 in the Background Art section of Lien. In contrast to the Examiner's opinion that this part of the patent is not "particularly relevant", this section of the patent explains previous attempts to solve the problems with displays. Lien claims to have found a new solution.

Applicants have discovered the source of a problem and through experimentation, have identified a solution. Neither Lien nor Ueda et al. are attempting to solve similar problems related to the length of time when the liquid crystal director reaches a stable state with the same solution of providing the common auxiliary electrode in the same layer as the gate lines. "[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole', which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Spinnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem . . . does not always result in a patentable invention. . . . [A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem." *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original).

Furthermore, the Examiner has not pointed out a particular finding as to the specific understanding or principle within the knowledge of a skilled artisan, either expressly or by implication that would have motivated one with no knowledge to combine or modify Lien. Accordingly, no proper motivation or suggestion is found in either Lien or Ueda et al. for one of ordinary skill in the art to combine the two teachings. Rather, Applicants respectfully submits that such combination is suggested only by the claimed invention and that combining is considered impermissible hindsight. Accordingly, Applicants respectfully requests withdrawal of the rejection based on the combination of Lien with Ueda et al.

On page 5 of the Office Action, the Examiner states, "*Lien does not explicitly show a passivation layer or the color filter layer being on the light-shielding layer, but these are conventional in the art and would be obvious to one [sic] of ordinary skill in order to avail*

themselves of well-established production methods” and on page 6 of the Office Action, the Examiner states, “*Claims 7, 8, 17, 19, 20, 22, 24-26, and 32-34 disclose well-known details of LCDs which would be obvious to one [sic] of ordinary skill in the art, motivated by the desire to avail themselves of convention features.*” The Examiner appears to take official notice by stating that a passivation layer on the gate insulating film including the first substrate, a color filter layer on the light-shielding layer, and the combination of elements in claims 7, 8, 17, 19, 20, 22, 24-26, and 32-34 are well-known, but fails to cite a reference in support of his position. Applicants respectfully traverse the assertion that the combination of elements recited in claims 1-3, 7-11, 17, and 19-36 are well-known, and request the Examiner to provide evidence in the next Office communication.

A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Applicants respectfully submit that they “seasonably” challenged the Examiner’s statement as early as the Amendment filed on March 5, 2002 in response to the first Office Action and that the Examiner may not take the object of the well-known statement to be admitted prior art during examination. Further, Applicants directs the Examiner to the MPEP Section 2144.03 and again traverses the assertion that the features recited in claims 7, 8, 17, 19, 20, 22, 24-26, and 32-34 are “well-known” and again requests the Examiner to cite a reference in support of his assertion.

The Examiner may take official notice of facts outside of the record which are capable of instant and unquestionable demonstration as being “well-known” in the art. *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970). As set forth in M.P.E.P. § 2144.03, if an applicants traverses an assertion made by an Examiner while taking official notice, the Examiner should cite a reference in support of their assertion.

In view of these distinguishing features, Applicants submits that there is no teaching or suggestion in the cited references that would motivate one of ordinary skill in the art to arrive at the multi-domain liquid crystal display device of at least independent claims 1 and 35. Applicants submit that claims 1 and 35 and the claims that depend therefrom are allowable.

In view of these amendments and remarks, Applicants respectfully submits that all of the pending claims of the application are in condition for immediate allowance.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

If the Examiner deems that a telephone conference would further prosecution of this application, the Examiner is invited to call the undersigned attorney at (202) 496-7371. All correspondence should continue to be sent to the below-listed address.

Respectfully submitted,

MCKENNA LONG & ALDRIDGE LLP

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By Teresa M. Arroyo
Teresa M. Arroyo
Registration No. 50,015

1900 K Street, N.W.
Washington, D.C. 20006
Telephone No.: (202) 496-7500
Facsimile No.: (202) 496-7756



MARKED-UP VERSION OF AMENDED CLAIMS

4. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate;

a pixel electrode in the pixel region, [wherein] the pixel electrode [does] not overlapping the common auxiliary electrode[.];

a light-shielding layer on the second substrate;

a color filter layer on the light-shielding layer;

a common electrode on the color filter layer;

a plurality of electric field distortion dielectric structures patterned in different forms within neighboring pixels; and

an alignment film on at least one of the first and second substrates.

12. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate, [wherein]
the pixel electrode [has] having an electric field induction window therein[.];

a pixel electrode in the pixel region;

a light-shielding layer on the second substrate;

a color filter layer on the light-shielding layer;

a common electrode on the color filter layer;

a plurality of electric field distortion dielectric structures patterned in different forms within neighboring pixels; and

an alignment film on at least one of the first and second substrates.

13. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate, [wherein]
the passivation film [has] having an electric field induction window therein[.];

a pixel electrode in the pixel region;

a light-shielding layer on the second substrate;
a color filter layer on the light-shielding layer;
a common electrode on the color filter layer;
a plurality of electric field distortion dielectric structures patterned in different forms
within neighboring pixels; and
an alignment film on at least one of the first and second substrates.

14. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;
a plurality of gate bus lines and data lines on the first substrate lengthwise and
crosswise, to define a pixel region;
a common auxiliary electrode on a layer equal to the gate lines to surround the pixel
region;
a gate insulating film on the first substrate, [wherein] the gate insulating film [has]
having an electric field induction window therein[.];
a passivation film on the gate insulating film including the first substrate;
a pixel electrode in the pixel region;
a light-shielding layer on the second substrate;
a color filter layer on the light-shielding layer;
a common electrode on the color filter layer;
a plurality of electric field distortion dielectric structures patterned in different forms
within neighboring pixels; and

an alignment film on at least one of the first and second substrates.

15. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate;

a pixel electrode in the pixel region;

a light-shielding layer on the second substrate;

a color filter layer on the light-shielding layer;

a common electrode on the color filter layer, [wherein] the common electrode [has] having an electric field induction window therein[.];

a plurality of electric field distortion dielectric structures patterned in different forms within neighboring pixels; and

an alignment film on at least one of the first and second substrates.

16. (Amended) [The multi-domain liquid crystal display device as claimed in claim 1,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate;

a pixel electrode in the pixel region;

a light-shielding layer on the second substrate;

a color filter layer on the light-shielding layer, [wherein] the color filter layer [has] having an electric field induction window therein[.];

a common electrode on the color filter layer;

a plurality of electric field distortion dielectric structures patterned in different forms within neighboring pixels; and

an alignment film on at least one of the first and second substrates.

18. (Amended) [The multi-domain liquid crystal display device as claimed in claim 17,] A multi-domain liquid crystal display device comprising:

first and second substrates opposing each other between a liquid crystal layer;

a plurality of gate bus lines and data lines on the first substrate lengthwise and crosswise, to define a pixel region;

a common auxiliary electrode on a layer equal to the gate lines to surround the pixel region;

a gate insulating film on the first substrate;

a passivation film on the gate insulating film including the first substrate;
a pixel electrode in the pixel region;
a light-shielding layer on the second substrate;
a color filter layer on the light-shielding layer;
an over coat layer on the color filter layer, [wherein] the over coat layer [has] having
an electric field induction window therein[.];
a common electrode on the over coat layer;
a plurality of electric field distortion dielectric structures patterned in different forms
within neighboring pixels; and
an alignment film on at least one of the first and second substrates.

37. [The multi-domain liquid crystal display device as claimed in claim 35,] A
multi-domain liquid crystal display device comprising:

a data line to apply a data signal;
a pixel electrode for driving a liquid crystal, [wherein] the pixel electrode [has] having
an electric field induction window therein[.];
a gate line crossed to the data line, to define a pixel region;
a common auxiliary electrode formed to surround the pixel region; and
a plurality of electric field distortion dielectric structures formed in different forms
within neighboring pixels.